

Application No. 09/309,157

Art Unit 2877

AMENDMENT

In accordance with 37 C.F.R. § 1.121, below is a clean set of the claims changed by this Amendment. These claims are shown in marked-up form in the Addendum attached hereto.

In the Claims:

1. (Three Times Amended) An apparatus for measuring the constituents of a substance, said apparatus comprising:

a light source capable of producing near infrared radiation in a controllable direction to a substance location;

a sensor oriented towards the substance location, said sensor being capable of sensing near infrared radiation reflected from or passing through the substance location;

C a housing including a monochromator having no moving optical components, said monochromator being capable of isolating narrow portions of the near infrared spectrum, said monochromator being selected from the group consisting of a stationary interferometer, a stationary Hadamard mask, an acoustic-optic tunable filter (AOTF), and an electro-optic modulator, said housing further including a detector positioned to quantify and simultaneously detect one or more narrow portions of the near infrared spectrum created by the monochromator;

a communication member between the sensor and monochromator to transfer the sensed near infrared radiation to the monochromator; and

a processor operatively connected to the monochromator, said processor being capable of identifying and determining the amount of constituents in the substance based on the quantified and simultaneously detected one or more isolated narrow portions of the near infrared spectrum;

wherein said housing is movable relative to the substance.

6 2). (Twice Amended) A method of analyzing a substance, said method comprising the steps of:

C2 irradiating the substance with near infrared light;

with a sensor, sensing near infrared light, which reflects off or passes through the substance;

isolating simultaneously the sensed radiation into one or more narrow portions of the spectrum, said step of isolating being selected from the group consisting of using a stationary

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interferometer, using a stationary Hadamard mask, using an acoustic-optic tunable filter (AOTF),
and using an electro-optic modulator;

analyzing one or more of the isolated narrow portions; and
determining the identity and amount of constituents in the substance;
wherein the sensor is moved relative to the substance.

C3 9 31 (Amended) The method of claim 21 further comprising utilizing the constituents for soil analysis.

16 33. (Twice Amended) A method of analyzing constituents of a substance in real time in a non laboratory setting subject to diverse and changing environmental conditions, said method comprising the steps of:

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irradiating the substance with near infrared light;
with a sensor, sensing near infrared light that reflects off or passes through the substance while moving the sensor relative to the substance;
isolating simultaneously the sensed radiation into one or more narrow portions of the spectrum, said step of isolating being selected from the group consisting of using a stationary interferometer, using a stationary Hadamard mask, using an acoustic-optic tunable filter (AOTF), and using an electro-optic modulator;
in real time, analyzing one or more narrow portions of the spectrum; and
determining the identity and amount of one or more constituents in the substance.

22 39. (Three Times Amended) A system for measuring constituents of substances in real time in a non-laboratory setting subject to diverse and changing environmental conditions, said system comprising;

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a light source capable of producing near infrared radiation in a controllable direction to a substance location;

a sensor oriented towards the substance location and capable of sensing near infrared radiation reflected from or passing through a substance at a substance location;

a monochromator having no moving optical components, said monochromator being selected from the group consisting of a stationary interferometer, a stationary Hadamard mask,

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an acoustic-optic tunable filter (AOTF), and an electro-optic modulator, said monochromator being capable of isolating narrow portions of the near infrared spectrum and having a detector positioned to quantify and simultaneously detect one or more isolated narrow portions of the near infrared spectrum created by the monochromator;

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a communication member between the sensor and the monochromator to transfer the sensed near infrared radiation to the monochromator; and

and
a processor operatively connected to the monochromator, said processor being capable of identifying and determining the amount of the constituents in the product based on the quantified and simultaneously detected one or more isolated narrow portions of the infrared spectrum.

2 40. (New) The apparatus of claim 1 wherein said monochromator is a stationary interferometer.

3 41. (New) The apparatus of claim 1 wherein said monochromator is a stationary Hadamard mask.

e 64 42. (New) The apparatus of claim 1 wherein said monochromator is an acoustic-optic tunable filter (AOTF).

5 43. (New) The apparatus of claim 1 wherein said monochromator is an electro-optic modulator.

11 44. (New) The method of claim 21 wherein the near infrared light is in the approximate range of 400 to 1700 nm in wavelength.

12 45. (New) The method of claim 21 wherein said step of isolating is using a stationary interferometer.

13 46. (New) The method of claim 21 wherein said step of isolating is using a stationary Hadamard mask.

14 47. (New) The method of claim 21 wherein said step of isolating is using an acoustic-optic tunable filter (AOTF).

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15 ~~48~~ (New) The method of claim ~~21~~ wherein said step of isolating is using an electro-optic modulator.

18 ~~49~~ (New) The method of claim ~~33~~ wherein said step of isolating is using a stationary interferometer.

19 ~~50~~ (New) The method of claim ~~33~~ wherein said step of isolating is using a stationary Hadamard mask.

20 ~~51~~ (New) The method of claim ~~33~~ wherein said step of isolating is using an acoustic-optic tunable filter (AOTF).

21 ~~52~~ (New) The method of claim ~~33~~ wherein said step of isolating is using an electro-optic modulator.

22 ~~53~~ (New) The system of claim ~~39~~ wherein said monochromator is a stationary interferometer.

24 ~~54~~ (New) The system of claim ~~39~~ wherein said monochromator is a stationary Hadamard mask.

25 ~~55~~ (New) The system of claim ~~39~~ wherein said monochromator is an acoustic-optic tunable filter (AOTF).

26 ~~56~~ (New) The system of claim ~~39~~ wherein said monochromator is an electro-optic modulator.

REMARKS

Applicant thanks the Examiner for the thoughtful comments in the Office Action of April 15, 2002. Claims 1, 21, 29-34, and 39 were pending in the application. Claims 1, 21, 29-34, and 39 were rejected by the Examiner in the Office Action of April 15, 2002. To further the prosecution of the above-reference application, the claims have been amended and the following